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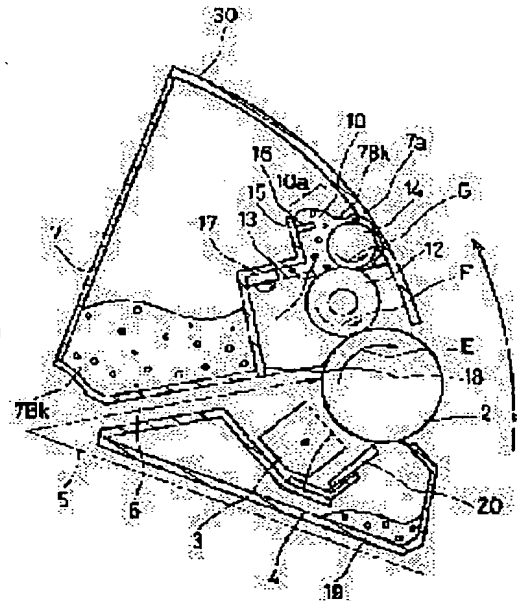
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(54) COLOR IMAGE FORMING DEVICE AND PROCESSING UNIT USED THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a superior color image forming device unit by which an unevenness in density or a fogging is not caused even in an environment of high temperature and high humidity and even after printing many sheets, and to provide a processing unit to be used therefor.

SOLUTION: A toner holding chamber 10 is formed to temporarily hold black toner 7Bk in the vicinity of a feeding roll 14 is formed in a developing part 30. The toner holding chamber 10 is formed of an exterior wall 7a of a toner hopper 7 and a toner holding wall 15 and an opening 10a communicating with the toner storing chamber of the toner hopper 7 is provided in this toner holding chamber 10. Furthermore, a toner retaining wall 16 is provided in the toner holding chamber 15 so that a part of the opening 10a is shielded. The toner retaining wall 16 is installed so that the black toner 7Bk of the feeding part S that is in the vicinity of a part where the feeding roll 14 and a developing roll 12 are brought close together among the black toner 7Bk in the toner holding chamber 10 is surrounded.



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CLAIMS

[Claim(s)]

[Claim 1] Latent-image support in which a latent image is formed of rotation A rotation mold developer which develops a latent image which was made to rotate two or more development units which have a development counter arranged in the surroundings of the axis of rotation by rotation of this axis of rotation, was made to move a development counter of arbitration to a development location which counters this latent-image support, and was formed on this latent-image support with this development counter It is image formation equipment equipped with the above, and is characterized by arranging a toner receptacle member which can catch a scattering toner which disperses from the above-mentioned rotation mold developer at least withdrawal to a main part of image formation equipment.

[Claim 2] Latent-image support in which a latent image is formed of rotation A rotation mold developer which develops a latent image which was made to rotate two or more development units which have a development counter arranged in the surroundings of the axis of rotation by rotation of this axis of rotation, was made to move a development counter of arbitration to a development location which counters this latent-image support, and was formed on this latent-image support with this development counter Are image formation equipment equipped with the above, and carry this latent-image support and this rotation mold developer at least, and it is held withdrawal to a main part of image formation equipment. So that a center-of-rotation axis of the above-mentioned latent-image support and a center-of-rotation axis of the above-mentioned rotation mold developer may become parallel at the predetermined gap It is characterized by arranging a toner receptacle member formed so that the lower part of this rotation mold developer might be covered to a drawer base material which consisted of stay members which make a propleuron and an epimeral plate which are supported to revolve for this latent-image support and this rotation mold developer, enabling free rotation, and this propleuron and an epimeral plate unify.

[Claim 3] Image formation equipment characterized by constituting the above-mentioned toner receptacle member removable to the above-mentioned drawer base material in image formation equipment of claim 2.

[Claim 4] Image formation equipment characterized by having a sealing means to seal a crevice between this drawer base material and a opening edge of this toner receptacle member in image formation equipment of claims 2 or 3 where the above-mentioned toner receptacle member is arranged in the above-mentioned drawer base material.

[Claim 5] Image formation equipment characterized by having an engagement maintenance fixed means to fix this toner receptacle member to this drawer base material where it held the above-mentioned toner receptacle member removable to the above-mentioned drawer base material and this toner receptacle member is held in image formation equipment of claims 2, 3, or 4 at this drawer base material.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to image formation equipments, such as a copying machine, facsimile, and a printer, and relates to the image formation equipment of the revolver development method which a development location is made to rotate in detail the development counter of the arbitration of two or more development units which have a development counter, and develops the latent image on latent-image support.

[0002]

[Description of the Prior Art] The image-formation equipment conventionally equipped with the rotation mold developer (henceforth a "revolver developer") which develops the latent image which was made to rotate two or more development units which have the development counter arranged in the surroundings of the axis of rotation by rotation of this axis of rotation, was made to move the development counter of arbitration to the development location which counters latent-image support, and was formed on this latent-image support with this development counter as this kind of image-formation equipment is known.

[0003] Generally, in order to secure the rigidity of that revolver developer, and precision, this kind of image formation equipment There are many by which this revolver developer is being attached and fixed to the main part of image formation equipment (only henceforth "the main part of equipment"). Moreover, in order to secure a user's safety, imaging devices attached and fixed in this main part of equipment, such as this revolver developer and a photo conductor drum as latent-image support, are covered by the propleuron of the main part of equipment, and they are constituted so that a user cannot touch this imaging device directly.

[0004] In addition, in order to raise the workability of a maintenance called exchange of the developer of the above-mentioned development counter etc., the image formation equipment of a configuration of having made the withdrawal drawer base material support imaging devices, such as the above-mentioned photo conductor drum and the usual developer, to the main part of equipment is proposed (for example, JP,61-58035,A, JP,62-37392,A, JP,3-34070,A, JP,58-54392,A, JP,3-50268,A, JP,9-2620790,B, JP,9-2603117,B (this is hereafter called well-known example), etc.).

[0005]

[Problem(s) to be Solved by the Invention] By the way, with this kind of image formation equipment, the contamination within the main part of equipment by the toner (henceforth a "scattering toner") which dispersed or fell from that development unit often poses a problem. In order to prevent contamination by the scattering toner within such a main part of equipment, preparing the toner receptacle member for catching the scattering toner from this developer in the lower part of the above-mentioned development unit is proposed.

[0006] However, as mentioned above, in order to secure the rigidity of the revolver developer, and precision, conventional image formation equipment There is much what attached this revolver developer to the main part of equipment, and was fixed. Again Since imaging devices attached and fixed in this main part of equipment, such as this revolver developer and a photo conductor drum, had composition covered by the propleuron of the main part of equipment in

order to secure a user's safety, the surrounding maintenance nature of this revolver developer had become a very bad configuration. For this reason, with this kind of image formation equipment, only by preparing the above-mentioned toner receptacle member, attachment and detachment of this toner receptacle member were able to become difficult, and were not able to raise the cleaning nature of that scattering toner.

[0007] Moreover, it can consider making the drawer base material held withdrawal to the main part of equipment support the above-mentioned revolver developer with a photo conductor drum like said well-known example as a method of solving such a problem. However, since the above-mentioned revolver developer has the complicated configuration which two or more development unit itself rotates as mentioned above, it is difficult for it for this drawer base material not to pass to have been transposed to the main part of equipment of image formation equipment, but to solve the above-mentioned problem fundamentally only by carrying this revolver developer in a drawer base material like this well-known example.

[0008] The place which this invention is made in view of the above trouble, and is made into the purpose is offering the image formation equipment which can raise sharply the service maintenance nature (cleaning nature) of the scattering toner from a development unit.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention of claim 1 Two or more development units which have latent-image support in which a latent image is formed of rotation, and a development counter arranged in the surroundings of the axis of rotation are rotated by rotation of this axis of rotation. In image formation equipment equipped with a rotation mold developer which develops a latent image which was made to move a development counter of arbitration to a development location which counters this latent-image support, and was formed on this latent-image support with this development counter It is characterized by arranging a toner receptacle member which can catch a scattering toner which disperses from the above-mentioned rotation mold developer at least withdrawal to a main part of image formation equipment.

[0010] In this image formation equipment, a toner receptacle member which can catch a scattering toner which disperses from the above-mentioned rotation mold developer at least is arranged withdrawal to a main part of image formation equipment. Therefore, with this image formation equipment, by pulling out this toner receptacle member from this main part of equipment, this toner receptacle member can be cleaned now very easily, and the service maintenance nature (cleaning nature) of a scattering toner from a development unit improves sharply.

[0011] Invention of claim 2 rotates two or more development units which have latent-image support in which a latent image is formed of rotation, and a development counter arranged in the surroundings of the axis of rotation by rotation of this axis of rotation. In image formation equipment equipped with a rotation mold developer which develops a latent image which was made to move a development counter of arbitration to a development location which counters this latent-image support, and was formed on this latent-image support with this development counter So that this latent-image support and this rotation mold developer may be carried at least, and it may be held withdrawal to a main part of image formation equipment and a center-of-rotation axis of the above-mentioned latent-image support and a center-of-rotation axis of the above-mentioned rotation mold developer may become parallel at the predetermined gap It is characterized by arranging a toner receptacle member formed so that the lower part of this rotation mold developer might be covered to a drawer base material which consisted of stay members which make a propleuron and an epimeral plate which are supported to revolve for this latent-image support and this rotation mold developer, enabling free rotation, and this propleuron and an epimeral plate unify.

[0012] In this image formation equipment, latent-image support and a rotation mold developer which are carried in this drawer base material are pulled out at a front-face side of the main part of equipment by pulling out the above-mentioned drawer base material from that main part of equipment. Moreover, since this drawer base material consists of stay members which make a propleuron and an epimeral plate which are supported to revolve for this latent-image support

and this rotation mold developer, enabling free rotation, and this propleuron and an epimeral plate unify, the structured division of this latent-image support and this rotation mold developer is exposed. Therefore, with this image formation equipment, it becomes possible to do a maintenance, an attachment-and-detachment activity, etc. of this latent-image support and a rotation mold developer with the condition of having pulled out this drawer base material from a main part of equipment, and that service maintenance nature improves. Since a toner receptacle member is arranged by drawer base material of easy configurations, such as such a maintenance and an attachment-and-detachment activity, the cleaning nature of this image formation equipment of a scattering toner accumulated on this toner receptacle member improves sharply. [0013] Invention of claim 3 is characterized by constituting the above-mentioned toner receptacle member removable to the above-mentioned drawer base material in image formation equipment of claim 2.

[0014] In this image formation equipment, since the above-mentioned toner receptacle member is constituted removable to the above-mentioned drawer base material, it is in a condition which removed this toner receptacle member from this drawer base material, and it becomes possible to clean a scattering toner on this toner receptacle member, and the cleaning nature of a scattering toner improves more.

[0015] In image formation equipment of claims 2 or 3, invention of claim 4 is in a condition which arranged the above-mentioned toner receptacle member in the above-mentioned drawer base material, and is characterized by having a sealing means to seal a crevice between this drawer base material and a opening edge of this toner receptacle member.

[0016] In this image formation equipment, by the above-mentioned sealing means, it is in a condition that the above-mentioned toner receptacle member was arranged by the above-mentioned drawer base material, and a crevice between this drawer base material and a opening edge of this toner receptacle member is sealed. Thereby, it is lost that a scattering toner falls and comes out of this toner receptacle member through this crevice.

[0017] In image formation equipment of claims 2, 3, or 4, invention of claim 5 is in a condition that held the above-mentioned toner receptacle member removable to the above-mentioned drawer base material, and this toner receptacle member was held at this drawer base material, and is characterized by having a toner receptacle member maintenance fixed means to fix this toner receptacle member to this drawer base material.

[0018] In this image formation equipment, by the above-mentioned toner receptacle member maintenance fixed means, it is in a condition that immobilization of the above-mentioned toner receptacle member to the above-mentioned drawer base material was canceled, and this toner receptacle member is held removable at this drawer base material. Thereby, when immobilization of the above-mentioned toner receptacle member to this drawer base material is canceled, this toner receptacle member separating from this drawer base material, and falling is lost.

[0019]

[Embodiment of the Invention] One operation gestalt which applied this invention to the color copying machine which is image formation equipment hereafter is explained. Drawing 1 shows roughly the device configuration of the color printer 500 concerning this operation gestalt. In drawing 1 441 ftheta lens and 443 for a laser exposure means and 442 A rotating polygon, 444 a double-sided copy combination automatic sheet paper cassette and 412B for a mirror and 412A A hand-feed paper tray, A feed roll and 418R 413A and 413B The register roll of a pair, The conveyance roll of a pair and 414 413F, 413G, 413H, and 413J A photo conductor drum, A middle imprint object (middle imprint belt) and 416 415 The 1st imprint means (primary imprint corotron), The 2nd imprint means (secondary imprint corotron) and 419 417 An electrification means (electrification scorotron), 420C, 420M, 420Y, and 420K, respectively Each development counter of cyanogen, yellow, a Magenta, and black, as for the revolver developer as a development means with which 420 constituted each development counter as the one aggregate, and 421, 423B discharge-rolls [a fixing roll and / the fixing back up roll and] 424, and a cleaner and 422 come [a conveyance belt and 423] out of an anchorage device and 423A.

[0020] a color printer 500 forms and outputs horizontal scanning and vertical scanning for the full color visible image with which horizontal scanning and vertical scanning consist of record dot

density of 1/16mm, or a 1/24mm dot pattern about CMYK each color on a transfer paper based on the pixel density of 1/16mm, or 1/24mm 2-bit record data about CMYK each color inputted into the communications control means which is not a drawing example. Selection of the record dot density of 1/16mm or a 1/24mm dot is beforehand specified by the mode selection command. A default is 1/16mm in dot density. In the above-mentioned configuration, if an image formation cycle is started, the photo conductor drum 414 will rotate the middle imprint belt 415 by photo conductor drive-motor 414M to the circumference of an anti-clock first at the circumference of a clock. With rotation of the middle imprint belt 415, C toner image formation, M toner image formation, Y toner image formation, and K toner image formation are performed, and, finally a toner image is made in piles on the middle imprint belt 415 in order of CMYK. Here, as C toner image formation is the following, it is performed. First, the electrification scorotron 419 is uniformly charged in -700V in a negative charge in the photo conductor drum 414 by corona discharge. Then, the laser exposure means 441 performs raster exposure based on C signal. The record signal for image formation is supplied from the system control module 600 from a scanner module in special copy mode, facsimile mode, or printer mode including an intellectual image processing in general copy mode. copy mode — setting — a scanner — a joule — receiving — printer mode and facsimile mode — a system control module — receiving — “ — record data can be sent after predetermined time and the data demand signal REQ “is emitted.

[0021] A record signal is inputted from a communications control means, and the laser drive circuit (not shown) which is a record control circuit carries out luminescence control of the laser exposure means 441 per input pixel based on this record signal. A record signal is 1 pixel 2 bits. At the time of an a maximum of C concentration pixel, only the amount of total horizontal-scanning width of face carries out laser luminescence, and light is not emitted at all at the time of a white pixel, but it is made to make only the time amount proportional to concentration data have emitted light in the case of the in-between concentration signal, speaking more concretely. Thus, when a raster image is exposed, the charge with which the portion by which the photo conductor drum 414 by which uniform electrification was carried out at the beginning was exposed is proportional to the exposure quantity of light disappears, and an electrostatic latent image is formed.

[0022] The toner in the development counter of the revolver developer 420 is charged in negative polarity by churning with a ferrite carrier, and bias of cyanogen development roll 420C of C development counter 420C is carried out to the potential superimposed on negative direct-current potential and an alternating current by the power supply means which is not illustrated to the metal base layer of the photo conductor drum 414. Consequently, a toner does not adhere to the portion in which the charge of the photo conductor drum 414 remains, but a portion without a charge, i.e., the exposed portion, will be adsorbed in C toner, and C visible image [**** / a latent image] will be formed in it.

[0023] Thus, if C toner image formed on the photo conductor drum 414 rotates by the circumference of an anti-clock and arrives at an opposite location at the primary imprint corotron 416, the corona transfer of it will be carried out to the middle imprint belt 415 driven with synchronous speed in contact with this photo conductor drum 414. The non-imprinted residual toner of the some on the photo conductor drum 414 after this imprint is cleaned by cleaning equipment 421 in preparation for the reuse of the photo conductor drum 414. The toner collected by this cleaning equipment 421 is stored in the waste toner tank which is not illustrated via a recovery pipe.

[0024] The material with a comparatively big specific resistance value is used for the above-mentioned middle imprint belt 425 in order to maintain the image support property of long duration especially with many demands with printer mode. Support of this middle imprint belt 425 was attained by this, without disturbing a toner image, even if the time amount to imaging of the following M toner was the long time amount of 20 minutes.

[0025] Next, M toner image formation is performed based on M signal. The revolver developer 420 is rotated to the circumference of an anti-clock, and M development roll 420M of M development counter are made to counter the development location of the photo conductor

drum 414, before performing raster exposure for this M toner image formation. subsequently, the head location of C visible image formed previously — the image location detection means 426 as a tip detection means — detecting — copy mode — setting — a scanner — a joule — receiving — ” — record M image data can be sent after predetermined time, and the demand signal REQ ” is emitted again. This demand signal is emitted when the aim doubling (registration) C toner mark image which the image tip location detection means which is not illustrated gave to them at the before production process more slightly than an effective C image is detected. Moreover, even if an image tip location detection means is a method which detects the lasting mark beforehand given to the middle imprint belt 415 instead of C toner mark image, and emits a demand signal, it does not interfere at all.

[0026] If it synchronizes with this demand signal correctly and M signal is sent, M image exposure, development, and a primary imprint will be performed, and it will double the color version to C image formed before, that is, M toner image will lap correctly on C toner image on the middle imprint belt 415. Thus, when M raster image is exposed, the charge with which the portion by which the photo conductor drum 414 by which uniform electrification was carried out at the beginning was exposed is proportional to the exposure quantity of light disappears, and an electrostatic latent image is formed.

[0027] M toner in M development counter of the revolver developer 420 is charged in negative polarity, and the development roll 420M up developer of M development counter of this revolver developer 420 contacts the photo conductor drum 414, and bias is carried out to the same potential as the case of C development. By this, M toner does not adhere to the portion in which the charge of the photo conductor drum 414 remains, but the portion exposed by M signal will be adsorbed in M toner, and M visible image corresponding to an electrostatic latent image will be formed in it.

[0028] Similarly, Y image is superimposed on CM and a between-image, K image is superimposed on a CMY image, respectively, and it is formed. In addition, since the basic image-processing means 300 is performing UCR (lower color removal) processing, there are few opportunities for one pixel to be developed with the toners of all four colors. Thus, rotation migration of the full color image which rotated at least four times and was formed on the middle imprint belt 415 is carried out to the secondary imprint part in which the secondary imprint corotron 417 is subsequently arranged.

[0029] On the other hand, from the three feed sections, i.e., cassette 412A, hand-feed paper tray 412B, and either of the external feed means (not shown), it is fed with record-medium 190A by a delivery or a conveyance operation of the feed rolls 413A and 413B or the conveyance roll of an external feeding means at the stage when image formation is started, and it is standing by by the nip of register roll 418R of a pair at it. And register roll 418R drives and resist doubling of transfer paper 190A and a toner image is performed so that the tip of the toner image on the middle imprint belt 421 may put in the secondary imprint corotron 417 and the tip of for example, transfer paper 190A may be in agreement at this tip of an image exactly at this time.

[0030] Thus, it passes through the bottom of the secondary imprint corotron 417 with which transfer paper 190A piled up with the toner image on the middle imprint belt 415, and was connected with the positive potential power supply. At this time, the electric charge of the transfer paper 190 is carried out with positive charge with corona discharge current, and most toner images are imprinted on transfer paper 190A. Then, when transfer paper 190A passes the electric discharge needle which was connected with the source of touch-down of the secondary imprint corotron 417 slightly described in the left and which is not illustrated, a charge is discharged and the adsorption power between the middle imprint belt 415 and transfer paper 190A is almost extinguished. And if the self-weight of transfer paper 190A comes to exceed the adsorption power of the middle imprint belt 415, transfer paper 190A will exfoliate from the middle imprint belt 415, and it will move from it to the conveyance belt 422.

(The following, margin)

[0031] Transfer paper 190A which carried the toner image is sent to an anchorage device 423 by a conveyance belt and 422. The toner of transfer paper 190A sent to this anchorage device 423 which applied and fused heat and a pressure in the nip section of fixing roll 423A and back-up-

roll 423B which were heated is in the fiber of transfer paper 190A, it eats away, it is fixed to an image, and a full color copy is obtained. With the discharge roll 424 of a pair, this copy is sent out out of the main part of equipment, on the tray which is not illustrated, it makes a copy image public and a stack is carried out.

[0032] By the way, in this kind of color printer, the contamination in main part of equipment 500A by the scattering toner which dispersed or fell from that development unit often poses a problem. In order to prevent contamination by the scattering toner in such main part of equipment 500A, as shown in drawing 1 , it is desirable to form the toner receptacle member 524 for catching the scattering toner from this revolver developer 420 in the lower part of this above-mentioned revolver developer 420.

[0033] However, in this kind of color printer, in order to secure the rigidity of that revolver developer, and precision, generally this revolver developer 420 is being attached and fixed to main part of equipment 500A. Moreover, imaging devices attached and fixed in this main part of equipment 500A, such as this revolver developer 420 and the photo conductor drum 414, are usually covered by the propleuron 533 (refer to drawing 3) of main part of equipment 500A, in order to secure a user's safety. Thus, at this kind of color printer, since the surrounding maintenance nature of this that revolver developer 420 has very bad composition, as mentioned above, only by forming the above-mentioned toner receptacle member 524, the attachment and detachment from measure main part 500A of this toner receptacle member 524 can become difficult, and cannot raise the cleaning nature of that scattering toner.

[0034] so, in the color printer 500 concerning this operation gestalt As shown in drawing 1 , for example, the toner receptacle member 524 which can catch the scattering toner which disperses from the above-mentioned revolver developer 420 at least While holding so that the guide rail 555 constructed between the propleuron 533 of main part of equipment 500A and the epimeral plate 530 can draw out to a cross direction to this main part of equipment 500A It considers as the configuration which formed attachment-and-detachment opening 533a of this toner receptacle member 524 in the propleuron 533 of this main part of equipment 500A.

[0035] The toner receptacle member 524 which can catch the scattering toner which disperses from the above-mentioned revolver developer 420 at least in this color printer 500 Since it is arranged withdrawal to main part of equipment 500A of a color printer 500 By pulling out this toner receptacle member 524 from this main part of equipment 500A, this toner receptacle member 524 can be easily cleaned now, and the service maintenance nature (cleaning nature) of the scattering toner from a development unit improves sharply.

[0036] Next, other operation gestalten of the above-mentioned color printer 500 are explained. Photo conductor unit 414U which consists of the above-mentioned revolver developer 420 and an imaging device arranged to the photo conductor drum 414 and its perimeter is carried in the withdrawal drawer base material 520 by slide from main part of equipment 500A of a color printer 500, and this color printer 500 is constituted so that it can pull out from main part of equipment 500A in one to a near side.

[0037] With reference to drawing 2 thru/or drawing 9 , the configuration of the above-mentioned drawer base material 520 is explained. This drawer base material 520 consists of a total of four stay members 523 of a propleuron 521, an epimeral plate 522, and the right and left and the upper and lower sides (un-illustrating) of a center section, and the toner receptacle member 524 (refer to drawing 2 and drawing 6) constituted so that it could detach and attach easily under the applied part equipped with the revolver developer 420 of this drawer base material 520, where the drawer base material 520 is pulled out is formed.

[0038] both the side section of this drawer base material 520 — AKYURA — the id — the slide rail (only henceforth a "slide rail") 525 is attached (drawing 3 , 6 reference), and, thereby, slide migration to the near side of main part of equipment 500A of this drawer base material 520 is enabled. two-step AKYURA from which the length at the time of receipt of a rail is 500mm, and the amount of slides is set to 650mm as this slide rail 525 — the id — the slide rail is adopted. Thereby, the drawer base material 520 is pulled out from main part of equipment 500A, and it becomes possible by carrying out halt support of the drawer base material 520 in this drawer location to carry out easily about a maintenance, an attachment-and-detachment activity, etc.

of the revolver developer 420 carried in this drawer base material 520, and photo conductor unit 414U, without taking an impossible posture.

[0039] Moreover, as shown in drawing 2 and drawing 6, the development counter of at least one or more development unit 420U in four development unit 420U arranged by the revolver developer 420 can detach [where the drawer base material 520 is pulled out from main part of equipment 500A] now and attach to above [of the drawer base material 520] (the direction of arrow head C). Moreover, photo conductor unit 414U can be similarly detached now and attached to above [of the drawer base material 520] (the direction of arrow head C). Thereby, in the condition of having stood on the side of the drawer base material 520, an operator comes to be able to do a maintenance and attachment-and-detachment activity of development unit 420U or photo conductor unit 414U, and can realize efficient-ization of an activity pace. In addition, in drawing 2 and drawing 6, the condition of having removed only Y development counter 420Y in which Y toner of each development unit 420U which consists of the development counters 420C, 420M, 420Y, and 420K and the toner supply equipments 45C, 45M, 45Y, and 45K of those of each color is held is shown.

[0040] The configuration of the connection section with main part of equipment 500A is indicated to be the above-mentioned drawer base material 520 to drawing 3. In drawing 3 The clearance of the maximum contiguity section of the photo conductor drum 414 and the developing rollers 41C, 41M, 41Y, and 41K (here developing-roller 41C of development counter 420C) of the development counters 420C, 420M, 420Y, and 420K of each color Fundamentally (it is hereafter called the development gap Gp) The center-of-rotation axis Or of the axis of rotation 40 of the revolver developer 420, Since clearance with the center-of-rotation axis Op of the photo conductor drum 414 is prescribed by the propleuron 521 and epimeral plate 522 of the drawer base material 520, precision reservation of this development gap Gp is [this drawer base material 520 simple substance] possible.

[0041] It is the ball bearing 526 arranged in the propleuron 521 of the drawer base material 520, and, specifically, the part of the direction near side of a drawer of the axis of rotation 40 of the revolver developer 420 (method side of the right of drawing 3) is supported to revolve. Moreover, the part on the backside [the direction of a drawer] of this axis of rotation 40 (left side of drawing 3) is supported to revolve with the bearing material 527 arranged in the epimeral plate 522 of the drawer base material 520. Furthermore, at least the core of the near side of the photo conductor drum 414 is held by shank 528a of the before [a photo conductor] side holder 528 arranged in the propleuron 521 of the drawer base material 520. Moreover, in the condition of having equipped with the drawer base material 520 in main part of equipment 500A, at least the core on the backside [the photo conductor drum 414] is really supported to revolve with drum driving shaft 414e currently supported by the backside [a photo conductor] holder 531 arranged in the epimeral plate 530 of this main part of equipment 500A that fits into the plain bearing 529 arranged in this epimeral plate 522, and invades in the drawer base material 520 pivotable.

[0042] Thereby, while precision reservation of the development gap Gp is attained, the support rigidity of the revolver developer 420 is secured just like [of the type which fixes this revolver developer 420 to main part of equipment 500A] image formation equipment. Moreover, with the image formation equipment of this configuration, since it is possible to assemble the drawer base material 520 as a simple substance, that assembly nature can be raised sharply.

[0043] As mentioned above, it sets in the condition of having equipped with the drawer base material 520 in main part of equipment 500A. While drum driving shaft 414e currently supported by this backside [a photo conductor] holder 531 fits into the plain bearing 529 arranged by the epimeral plate 522 and really supports at least the core on the backside [the photo conductor drum 414] to revolve pivotable The back end section (left end section of drawing 3) of the axis of rotation 40 of the revolver developer 420 It fits into the plain bearing 532 arranged by the epimeral plate 530 of main part of equipment 500A. Furthermore, when the criteria pin 534 arranged by the propleuron 533 of main part of equipment 500A fits into the location hole 535 dug by the propleuron 521 of the drawer base material 520, the positioning receipt of the drawer base material 520 is carried out to main part of equipment 500A. Thus, the location precision of

the photo conductor drum 414 and main part of equipment 500A is securable, maintaining the location precision of the photo conductor drum 414 and the revolver developer 420 by constituting.

[0044] Moreover, as shown in drawing 3 and drawing 4 (a), and (b), the above-mentioned drawer base material 520 is constituted so that it may be held, when notch 523a of the shape of U character formed in the stay member 523 of the drawer base material 520 engages with the neck of the boss 536 of the shape of an owner head pin implanted in this slide rail 525 to the slide rail 525 fixed to main part of equipment 500A. Thus, this drawer base material 520 can be easily detached [base material / since this drawer base material 520 is held to the slide rail 525 fixed to main part of equipment 500A, without using a holddown member / in the condition of having pulled out the drawer base material 520] from this main part of equipment 500A and attached to main part of equipment 500A.

[0045] Moreover, in the condition that the positioning receipt of this drawer base material 520 was carried out to main part of equipment 500A, as shown in drawing 4 (b), this drawer base material 520 is constituted so that few crevices d may be generated in the engagement section of notch 523a formed in the stay member 523 the drawer base material's 520, and a boss's 536 neck implanted in the slide rail 525. Thereby, interference of the positioning section to main part of equipment 500A of the drawer base material 520 is prevented, and it comes to fit in smoothly, without this drum driving shaft 414e, plain bearing 529, the back end section of the axis of rotation 40 and plain bearing 532, and the criteria pin 534 and a location hole 535 receiving a respectively impossible load at the time of receipt of the drawer base material 520 into main part of equipment 500A.

[0046] Next, the configuration of a revolver developer is explained. Drawing 5 is the outline block diagram of the above-mentioned revolver developer 420. opening which turned this revolver developer 420 to the photo conductor drum 414 -- having -- a circumferencial direction -- mutual -- almost -- four development counters 420K, 420Y, 420M, and 420C of isomorphism -- this -- it has four development units which become four development counters from each toner supply equipments 45K, 45Y, 45M, and 45C for supplying the toner for supply, respectively. In addition, in the example of illustration, black development counter 420K which held the black toner and the carrier is in the development location which counters the photo conductor drum 414, and it has become cyanogen development counter 420C which held the yellow toner, yellow development counter 420Y which held the carrier and a Magenta toner, Magenta development counter 420M which held the carrier and a cyanogen toner, and the carrier in order of the counterclockwise rotation in drawing.

[0047] Since the internal structure of four development counters 420K, 420Y, 420M, and 420C is completely the same, here As a sign of the member which explains a internal structure hereafter taking the case of black development counter 420K in a development location, and corresponds about the internal structure of other development counters In order to distinguish each development counter of yellow, a Magenta, and cyanogen with the same numeric character as the sign in the black development counter K, the sign which attached the subscript of Y, M, and C is shown all over drawing, and those explanation is omitted.

[0048] The above-mentioned black development counter 420K Developing-roller 41K as developer support, The 1st and the 2nd two churning screws 42K and 43K which agitate the two component developer (henceforth a developer) set to development casing 47K from the black toner and carrier which are held in these casing circles, It has very simple composition equipped with development doctor 44K as a developer thickness regulation means which carries out lamination of the developer supported by developing-roller 41K.

[0049] The development counters 420K, 420Y, 420M, and 420C of each development unit are positioned respectively free [attachment and detachment] by the unit base material 48 united with the axis of rotation 40 of the revolver developer 420, as shown in drawing 5 . Moreover, the toner supply equipments 45K, 45Y, 45M, and 45C of each development unit the unit base material 48 and really have composition, and rotate with the unit base material 48 by rotation of this axis of rotation 40.

[0050] Each toner supply equipments 45K, 45Y, 45M, and 45C consist of toner supply screws

49K, 49Y, 49M, and 49C, toner supply cases 50K, 50Y, 50M, and 50C, and toner cartridge guides 51K, 51Y, 51M, and 51C.

[0051] Each toner cartridges 46K, 46Y, 46M, and 46C in which the toner of each color is held let opening 521a for toner cartridge attachment and detachment (drawing 2 , 6 reference) dug by the propleuron 521 of the drawer base material 520 pass, and are detached and attached from the near side of the drawer base material 520 to each toner cartridge guide 51K, 51Y, 51M, and 51C. And if toner cartridges 46K, 46Y, 46M, and 46C are inserted and set in the predetermined toner cartridge guides 51K, 51Y, and 51M and 51C The toner in this toner cartridge is sent in only for an initial complement in the above-mentioned toner supply cases 50K, 50Y, and 50M and 50C. By rotation of the toner supply screws 49K, 49Y, 49M, and 49C The part of the near side of the development casing 47K, 47Y, and 47M of each development counters 420K, 420Y, 420M, and 420C and the 2nd churning screws 43K, 43Y, 43M, and 43C in 47C is supplied little by little. In addition, this toner supply actuation is performed only in the development counter (drawing 5 the black development counter 420 K) which attended this development location and countered the photo conductor drum 414.

[0052] the 2nd of these black development counter 420K — the black toner supplied to the part of the near side of churning screw 43K — this — the 2nd — it is conveyed being agitated at the posterior part side of development casing 47K, and rotation of churning screw 43K distributes in the developer in this development casing. And the black toner by which was distributed in the developer and churning conveyance was carried out at the posterior part side of development casing 47K the 1st churning screw 42K side is won popularity and passed in this back end section of development casing 47K — having — this 1st [the] — by rotation of churning screw 42K It is conveyed being agitated by the near side of development casing 47K, and the 2nd churning screw 43K side is again won popularity and passed in this front end section of development casing 47K.

[0053] Thus, in the conveyance process, the part is pumped up by developing-roller 41K, and support conveyance of the developer by which circulation conveyance is carried out within development casing 47K is carried out in the direction of an arrow head of drawing 5 . After lamination of the developer in which support conveyance was carried out by developing-roller 41K is carried out by development doctor 44K, it is conveyed to a development field and forms the electrostatic latent image on the photo conductor drum 414 into a toner image in this development field.

[0054] That base consists of nonmagnetic sheet metal, and each above-mentioned development doctors 44K, 44Y, 44M, and 44C arrange a magnetic board in the point by the side of the inside of this base, and are constituted. Thus, by using the development doctor of a configuration of having arranged the magnetic board for the point by the side of the inside of a base, ground the magnetism of the doctor pole (magnetic pole of the magnet which counters a development doctor and is arranged) of each developing rollers 41K, 41Y, 41M, and 41C, the sliding field of developers is made to increase, and effective starting of a developer can be performed.

[0055] The development counters 420K, 420Y, 420M, and 420C of each development unit 420U In the condition of having positioned to the unit base material 48 united with the axis of rotation 40 of the revolver developer 420 as shown in drawing 5 A pair each of development counter support holders 52K, 52Y, 52M, and 52C currently arranged by the side plates 54 and 55 (refer to drawing 2) before and behind the revolver developer 420 as shown in drawing 26 , It is attached free [attachment and detachment] to the revolver developer 420 by holding pivot 41a of the both ends of each developing rollers 41K, 41Y, 41M, and 41C with the developing-roller positioning holders 53K, 53Y, 53M, and 53C.

[0056] Here the above-mentioned developing-roller positioning holders 53K, 53Y, 53M, and 53C As shown in drawing 7 and drawing 8 , the side plates 54 and 55 before and behind the revolver developer 420 are received. By being constituted rotatable in the direction of an arrow head focusing on supporting-point 53a, and carrying out displacement of the location of the driving shaft of each developing rollers 41K, 41Y, 41M, and 41C by rotation of this developing-roller positioning holder It is constituted so that it may adjust, Clearance Gp, i.e., the development gap, of the surface of this developing roller and the photo conductor drum 414.

[0057] Adjustment of this development gap Gp is performed per drawer base material. for example, the thing for which the development field between the photo conductor drum 414 and the developing roller (here the developing roller 41 K) which countered this is supervised, and the image of this CCD camera 540 is binary—ization—processed with CCD camera 540 installed above the drawer base material 520 as shown in drawing 7 — this — the clearance of the surface of developing—roller 41K and the photo conductor drum 414 is measured.

[0058] And based on the measured value of this CCD camera 540, as shown in drawing 9 , by the development gap control means 541, the development gap pressurization adjustment device 542 which consists of a hydraulic power unit etc. is driven, and developing—roller positioning holder 53K are rotated by pressurization head 542a of this development gap pressurization adjustment device 542.

[0059] displacement of the location of the driving shaft of developing—roller 41K is carried out by this rotation of developing—roller positioning holder 53K — making — this — it adjusts, Clearance Gp, i.e., the development gap, of the surface of developing—roller 41K and the photo conductor drum 414. And when the measured value of CCD camera 540 is in agreement with the predetermined development gap Gp set up beforehand, the drive of the development gap pressurization adjustment device 542 by the development gap control means 541 is stopped.

[0060] thus, after the development gap Gp of developing—roller 41K and the photo conductor drum 414 is adjusted proper, it lets the installation holes 53b and 53c pass, and to the side plates 54 and 55 before and behind the revolver developer 420, each developing—roller positioning holder 53K is ****ed on the screw which is not a drawing example, carries out a stop, and is fixed. Thereby, where the development gap Gp of developing—roller 41K and the photo conductor drum 414 is kept proper, development counter 420K are attached in the revolver developer 420. It is attached in the revolver developer 420 where the development gap Gp is kept proper like the above—mentioned development counter 420K also about each of other development counter.

(The following, margin)

[0061] Here between each development counters 420K, 420Y, 420M, and 420C and the unit base material 48 As shown in drawing 7 and drawing 9 , the elastic body 56 which consists of foamed rubber or a flat spring is arranged. To each development counters 420K, 420Y, 420M, and 420C The habit of displacing by the elasticity of this elastic body 56 in the direction of a normal of the axis of rotation 40, i.e., the direction in which each developing rollers 41K, 41Y, 41M, and 41C approach the photo conductor drum 414 in an opposite part with the photo conductor drum 414, is given. Thereby, the driving direction of pressurization head 542a of the above—mentioned development gap pressurization adjustment device 542 at the time of development gap Gp adjustment is specified only in the direction which goes to the center of rotation of the revolver developer 420, and can simplify control of this development gap pressurization adjustment device 542.

[0062] moreover, the adjustment method of this development gap Gp is shown in drawing 7 — as — the center of rotation of the revolver developer 420 — present — the center of rotation of roller 41K and the center of rotation of the photo conductor drum 414 are located on a straight line, respectively — as — this revolver developer 420 — present — simple and high development gap adjustment of precision is made possible by arranging roller 41K and the photo conductor drum 414.

[0063] In addition, the developing roller and photo conductor drum which are used at the time of this development gap adjustment may not be used in actual image formation equipment, and may be those mockups (fixture). Thus, the damage and contamination which are generated by malfunction, adjustment actuation, etc. of the developing roller actually carried and a photo conductor drum of the development gap pressurization adjustment device 542 at the time of this development gap adjustment are avoidable by using a mockup (fixture) as a developing roller and a photo conductor drum at the time of development gap adjustment.

[0064] As mentioned above, in the color printer 500 concerning this operation gestalt, as shown in drawing 2 , the photo conductor drum unit 414U ** revolver developer 420 carried in this drawer base material 520 can be pulled out to the front—face side of the main part of equipment

by pulling out the above-mentioned drawer base material 520 from the main part of equipment 500A. Moreover, since this drawer base material 520 consists of stay members 523 which make the propleuron 521 and epimeral plate 522 which are supported to revolve for the photo conductor drum 414 and the revolver developer 420, enabling free rotation, and this propleuron 521 and an epimeral plate 522 unify, it can do easily a maintenance, the attachment-and-detachment activity, etc. of the photo conductor drum 414 or the revolver developer 420 with the condition of having pulled out the above-mentioned drawer base material 520 from main part of equipment 500A.

[0065] Therefore, in this color printer 500, since the toner receptacle member 524 for catching the toner which dispersed from each development counter of the revolver developer 420, or fell is arranged as shown in the lower part of the drawer base material 520 of easy configurations, such as the above maintenances and an attachment-and-detachment activity, at drawing 2 and drawing 6, the cleaning nature (service maintenance nature) of the scattering toner accumulated on this toner receptacle member 524 can be raised sharply.

[0066] Moreover, the toner receptacle member 524 in the color printer 500 concerning this operation gestalt is constituted removable to the above-mentioned drawer base material 520. An example of the installation structure to the above-mentioned drawer base material 520 of this toner receptacle member 524 is shown in drawing 10.

[0067] In drawing 10, bending formation of the maintenance piece 522a as a maintenance means by which the epimeral plate of the above-mentioned toner receptacle member 524 holds ** is carried out towards the propleuron 521 side of this drawer base material 520 in the lower limit of the epimeral plate 522 of the drawer base material 520. Moreover, as shown in drawing 11, maintenance hole 524a of the shape of a slit of the magnitude which fits into this maintenance piece 522a is prepared in the part corresponding to this maintenance piece 522a of ** in the epimeral plate of this toner receptacle member 524. On the other hand, owner capitate fixed screw 521a as a maintenance fixed means which the propleuron of this toner receptacle member 524 holds ** to this drawer base material 520, and fixes to it is screwed in the propleuron 521 of the drawer base material 520. Moreover, as shown in drawing 12, maintenance fixed hole 524b which cut in the shape of L character, and was lacked towards the slanting lower part from the upper limit edge of this toner receptacle member 524 is prepared in the part corresponding to this fixed screw 521a of ** in the propleuron of this toner receptacle member 524.

[0068] And first, as shown in drawing 10, while the epimeral plate of this toner receptacle member 524 makes maintenance hole 524a of ** fit into maintenance piece 522a of the lower limit of the epimeral plate 522 of this drawer base material 520 To fixed screw 521a currently screwed in the propleuron 521 of this drawer base material 520 The propleuron of this toner receptacle member 524 makes maintenance fixed hole 524b of ** engaged, and this toner receptacle member 524 is held removable to this drawer base material 520. Subsequently Installation to this drawer base material 520 of this toner receptacle member 524 is performed by binding this fixed screw 521a tight and fixing this toner receptacle member 524 to this drawer base material 520.

[0069] Thus, by constituting the above-mentioned toner receptacle member 524 removable to the above-mentioned drawer base material 520, where this toner receptacle member 524 is removed from this drawer base material 520, it can become possible to clean the scattering toner on this toner receptacle member 524, and the cleaning nature of a scattering toner can be raised more.

[0070] Moreover, by the printer 500 concerning this operation gestalt, since the attachment and detachment of the above-mentioned toner receptacle member 524 to the above-mentioned drawer base material 520 are attained where the above-mentioned fixed screw 521a is loosened so that clearly from an above-mentioned configuration, attachment-and-detachment actuation of this toner receptacle member 524 can be performed very easily. Furthermore, after the above-mentioned fixed screw 521a has loosened, since this toner receptacle member 524 is held at this drawer base material 520, when immobilization of the toner receptacle member 524 to this drawer base material 520 is canceled, from this drawer base material 520, this toner receptacle member 524 separates and does not fall.

[0071] That is, it consists of common image formation equipment so that the above maintenances (cleaning) of a scattering toner may be performed from the transverse-plane side (side which met the propleuron 533) of main part of equipment 500A. Therefore, in the case of such image formation equipment of a configuration, in drawing 10, a maintenance will be performed from the method side of the right of the propleuron 521 of the drawer base material 520.

[0072] However, if a maintenance is performed in this way in the location by the side of the transverse plane of main part of equipment 500A In case the above-mentioned fixed screw 521a is loosened and the above-mentioned toner receptacle member 524 is taken out to a near side, for example, maintenance piece 522a of the epimeral plate 522 of the above-mentioned drawer base material 520, A possibility of the epimeral plate side of this toner receptacle member 524 that lost the support falling the moment the engagement to maintenance hole 524a of this toner receptacle member 524 separated, and polluting a floor line and the drawer base material 520 is very high.

[0073] On the other hand, at the color printer 500 concerning this operation gestalt, where the drawer base material 520 is pulled out from main part of equipment 500A to a near side, attachment-and-detachment actuation of that toner receptacle member 524 can be performed from the side side of this pulled-out drawer base material 520, so that clearly from an above-mentioned configuration. Therefore, in the color printer 500 concerning this operation gestalt, since the attachment-and-detachment actuation can be performed now and fall of the above toner receptacle members 524 can be prevented at the time of attachment and detachment of this toner receptacle member of 524 while a user supports a propleuron [of this toner receptacle member 524], and epimeral plate side with both hands, the maintenance serviceability improves sharply.

[0074] Moreover, the above-mentioned toner receptacle member 524 is in the condition arranged by the above-mentioned drawer base material 520, as shown in drawing 6. The crevice between this drawer base material 520 and the opening edge (upper limit edge) of this toner receptacle member 524 It is constituted by ** blocked by seal member 524c which consists of firing rubber, firing urethane (sponge), etc. as a sealing means stuck on the stay 523 of a center section and the left end section of this drawer base material 520.

[0075] Thus, it is lost that the crevice between this drawer base material 520 and the opening edge of this toner receptacle member 524 is sealed by the above-mentioned seal member 524c, and a scattering toner falls and comes out of this toner receptacle member 524 through this crevice by things after the above-mentioned toner receptacle member 524 has been arranged by the above-mentioned drawer base material 520.

[0076]

[Effect of the Invention] Since the toner receptacle member which can catch the scattering toner which disperses from the above-mentioned rotation mold developer at least is arranged withdrawal to the main part of image formation equipment according to invention of claim 1, by pulling out this toner receptacle member from this main part of equipment, this toner receptacle member can be cleaned now very easily, and the service maintenance nature (cleaning nature) of the scattering toner from a development unit improves sharply.

[0077] According to claim 2 thru/or invention of 5, latent-image support and a rotation mold developer are carried. A propleuron and an epimeral plate, Since the toner receptacle member was arranged in the withdrawal drawer base material to the main part of equipment which consisted of stay members which make this propleuron and an epimeral plate unify It becomes possible from the main part of equipment to clean the scattering toner accumulated on this toner receptacle member, where this drawer base material is pulled out, and there is an outstanding effect that the cleaning nature of a scattering toner and the service maintenance nature of a toner receptacle member improve sharply.

[0078] Since the above-mentioned toner receptacle member is especially constituted removable to the above-mentioned drawer base material according to invention of claim 3, where this toner receptacle member is removed from this drawer base material, it becomes possible to clean the scattering toner on this toner receptacle member, and there is an outstanding effect that the

cleaning nature of a scattering toner and the service maintenance of a toner receptacle member can be improved more.

[0079] Moreover, since according to invention of claim 4 the above-mentioned drawer base material is equipped with a sealing means to seal the crevice between this drawer base material and the opening edge of this toner receptacle member where the above-mentioned toner receptacle member is arranged, there is an outstanding effect that contamination of the recording paper by a scattering toner beginning to fall out of this toner receptacle member through this crevice, a recording paper conveyance way, etc. can be prevented.

[0080] Moreover, according to invention of claim 5, after immobilization of this toner receptacle member to this drawer base material has been canceled by the above-mentioned toner receptacle member maintenance fixed means Since this toner receptacle member can be made to hold removable to this drawer base material, there is an outstanding effect that the contamination of the equipment circumference by the fall from this drawer base material of this toner receptacle member at the time of canceling immobilization of this toner receptacle member to this drawer base material can be prevented.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The schematic diagram showing the configuration of the image formation equipment concerning this operation gestalt.

[Drawing 2] The outline perspective diagram showing the configuration of the drawer base material of the above-mentioned image formation equipment.

[Drawing 3] The outline plan showing the configuration of the above-mentioned drawer base material.

[Drawing 4] The important section side elevation showing the installation structure to the slide rail of the stay member of the above-mentioned drawer base material.

[Drawing 5] The outline block diagram showing the configuration of the revolver developer of the above-mentioned image formation equipment.

[Drawing 6] Outline front view showing the condition of having carried the above-mentioned revolver developer in the above-mentioned drawer base material.

[Drawing 7] Explanatory drawing for explaining the configuration of the anchoring section of the development unit of the above-mentioned revolver developer.

[Drawing 8] Important section front view showing the configuration of the anchoring section of the above-mentioned development unit.

[Drawing 9] The outline plan for explaining the adjustment method of the development gap of the above-mentioned development unit.

[Drawing 10] The outline cross section showing the installation structure of the toner receptacle member to the above-mentioned drawer base material.

[Drawing 11] The epimeral plate of the above-mentioned toner receptacle member is the side elevation of **.

[Drawing 12] The propleuron of the above-mentioned toner receptacle member is the side elevation of **.

[Description of Notations]

414 Photo Conductor Drum

420 Revolver Developer

420K Black development counter

420C Cyanogen development counter

420M Magenta development counter

420Y Yellow development counter

500 Color Printer

500A The main part of equipment of a color printer

520 Drawer Base Material

521 Propleuron of Drawer Base Material

521a Fixed screw

522 Epimeral Plate of Drawer Base Material

522a Maintenance piece

523 Stay Member of Drawer Base Material

524 Toner Receptacle Member

524a Maintenance hole
524b Maintenance fixed hole
524c Seal member
525 AKYURA — Id — Slide Rail

[Translation done.]